ISO TC 184/SC4 QUALITY COMMITTEE DOCUMENT

Technical Committee 184 for Industrial Automation Systems and Integration

Subcommittee 4 for Industrial Data

ISO TC 184/SC4 Quality Committee Transition Plan

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ISO TC 184/SC4 Quality Committee Transition Plan

1 Introduction

This document describes a plan for transitioning quality reviews within ISO TC 184/SC4 from an inspection-based program heavily reliant on resources appropriated from ISO 10303 application protocol project teams to a program in which all SC4 project teams are empowered to build quality into their parts.

The transition will occur along two axes. It will:

— expand the scope of quality reviews to cover all SC4 standards, including developing relevant documentation, processes, checklists and training materials to support all SC4 standards;

— evolve centralized quality reviews from detailed inspections to brief audits, leaving responsibility for detailed reviews to the project team, and transferring the resource burden from reviews to documentation and education.

1.1 Vision

Create a standards development infrastructure within ISO TC 184/SC4 such that the standards products of SC4 (International Standards, Technical Reports and Standing Documents) are produced at higher quality with less centralized review and less rework.

1.2 Goals

The primary goals to be achieved through this transition are:

— to provide the benefits of quality reviews realized by ISO 10303 parts to all standards products of SC4 sent forward for ballot;

— to provide these benefits with reduced reliance on centralized reviews;

— to reduce the resource burden on SC4 projects.

1.3 Objectives

Objectives supporting the above goals include:

— to provide stable, written guidance on quality methods for the development of all aspects of SC4 standards products;

— to develop the framework of an SC4 training program and to provide or identify training opportunities that enable SC4 project teams to produce quality standards products;

— to provide a quality system that includes review procedures and checklists for internal project and working group use in measuring the effectiveness of the quality methods used;

— to provide a feedback mechanism for improvement of review procedures, methods documents, checklists;

— to provide an efficient means of transitioning the scope of quality reviews to all SC4 standards products and of transferring responsibility for reviews to the project teams.

2 Today's quality environment

In today's quality environment, project teams provide resources to the Quality Committee according to the SC4 resolution included in 2.1.

Detailed reviews are centrally coordinated by the Quality Committee Production Support Team Leader as described in 2.2.

A number of problems have been raised with the current environment. These problems are listed in 2.3.

2.1 Today's resource requirements

The resource requirement to support the quality reviews of SC4 parts was approved by SC4 in late 1996 and appears in the *SC4 Organization Handbook* [SC4N679]. The text is repeated below:

"The following requirements shall be imposed on SC4 Projects for the provision of resources for quality tasks:

— each New Work Item Proposal shall identify the resources to be provided for quality tasks;

— each project that is developing an ISO 10303 application protocol shall allocate a minimum of one-half person-year (900 hours) for quality tasks, over the period from approval of the New Work Item to registration as a Final Draft International Standard;

— each project that is developing an ISO 10303 abstract test suite shall allocate a minimum of one-quarter person-year (450 hours) for quality tasks, over the period from approval of the New Work Item to registration as a Final Draft International Standard;

— each SC4 project that is developing a standard other than an application protocol, AIC or abstract test suite shall allocate a minimum of one-quarter person-year (450 hours) for quality tasks, over the period from approval of the New Work Item to registration as a Final Draft International Standard;

— each SC4 project shall support travel and subsistence for their resource allocated to the Quality Committee, for up to six workshops (effort will be made to co-locate workshops with other project activities) over the period specified above;

— the resources provided by each project shall be allocated to quality tasks by agreement between the project leader and the Quality Committee;

— the resources provided by each project to the Quality Committee shall be allocated to support the quality requirements of other SC4 projects;

— the Quality Committee shall track work undertaken by the resources provided by each project in terms of tasks undertaken and time expended; and

— the work undertaken by the resources provided by each project shall be periodically assessed, in terms of both quality and quantity, by the Quality Committee and reported to the project leader.

These requirements apply to New Work Items that are approved after 10 October 1996. The previous requirement of 900 hours over the life of the project was only applied to ISO 10303 application protocols. This previous requirement will remain in effect and be valid for all previously approved AP projects that reach Final Draft International Standard status by 11 October 2000.[1] All SC4 projects which have not reached FDIS status by this date will be subject to the additional resource requirements."

2.2 Today's process

This clause summarizes the document review procedures currently in place. Additional detail on the process may be found in *SC4 Part Review Procedure* [QCN007]. These part review procedures and checklists described below were designed for ISO 10303 parts, and 10303 application protocols, in particular. Their application is being extended, but the documents are written for ISO 10303.

A document is considered complete and ready for review when it fulfills all the requirements stated in the applicable edition of the *Supplementary directives for the drafting and presentation of ISO 10303* (typically the most recent published version [SC4N537]) as well as requirements specified in the relevant methods documents.

When the document is complete, the project leader shall sign-off that the part is complete and of high quality. The project leader completes the *Project Leader Approval Check List for ISO 10303* [QCN025], a list of quality checks that they are to verify have been completed. Errors found in this step shall be corrected prior to the next step.

After the project leader signs-off, the document and completed *Project Leader Approval Check List for ISO 10303* are forwarded to the working group convener. The convener completes the *Conveners Approval Check List for ISO 10303* [QCN024], a list of quality checks that they are to verify have been completed. Errors found at this time result in the part being returned by the convener to the project for correction.

After the convener signs-off, the part, supporting documentation and completed checklists are forwarded to the Quality Committee Production Support team leader.

[1] This date was selected based on current schedules provided by project leaders as recorded in the SC4 project database.

A number of quality review tasks have been defined for different types of parts. Quality review tasks rely on detailed inspection of the components of the documents and cross-checking of the different clauses, in addition to structural and format reviews. These tasks are documented in the *STEP application protocol qualification manual* [SC4N369].

When a part is received for review, the Quality Committee Production Support team first performs a spot-check of the document. If he finds more than six issues on any three pages, the document is returned to the project leader and the convener is notified. If it passes this initial check, the Production Support team leader assembles a review team from the pool of resources and the review tasks are divided among members of the team. Issues raised during the review are collected and forwarded to the project team. Quality workshops may be required when there are a variety of different types of errors on a given part, or at the request of the project team. The project team incorporates the corrections, and the part is returned to Quality Committee for a post-review examination and sign-off.

Quality Committee review and sign-off is required on parts from CD through FDIS status.

2.3 Today's problems

The following are some real or perceived problems with the current quality review environment:

— Quality Committee review is a bottle-neck because of distribution delays getting reviewers copies of the document, shortage of and schedule constraints of trained reviewers;

— the resource requirement is a burden on project teams, and is not assessed equitably according to document size or complexity;

— SC4 standards other than ISO 10303 documents are not covered by methods documents or detailed review procedures;

— SC4 standards other than ISO 10303 documents are not under resource requirement or review procedure due to the applicability of the resource requirement (see 2.1) to NWIs approved after October 1996. NWIs approved prior to 1996 often spawned many parts; those parts are not covered by this requirement. The requirement should be restated to cover parts that have not yet been published as CD.

3 Target quality environment

The intent of the transition is to incorporate some principles of ISO 9000 [ISO9000-1] in the development of a quality system for SC4. The Quality Committee will provide an *SC4 quality handbook*[2] that references specifications for standards product development, documents review and approval procedures, and outlines a communication feedback loop that enables improvement of the specifications and procedures.

[2] To be published.

The Quality Committee will also provide an *SC4 training program*[2] that identifies sources of information for SC4 part developers.

The Quality Committee will oversee implementation of *SC4 training program* and provide some core training opportunities to SC4 project teams, according to resource availability.

Project teams and working groups will be responsible for part quality. Project teams will spend resource hours primarily on internal reviews and improvements to the review process, approval check lists, methods documents and training materials.

Project teams and working groups will coordinate and conduct part reviews, documenting review processes used, issues raised, resolution of issues, deferment of issues, and quality methods used. Project leader and convener sign-offs will remain.

The internal review report shall verify that the part documentation is complete and satisfies the appropriate ISO and TC 184/SC4 methods documents. The internal review report shall identify all violations to any of the applicable methods documents to which the part shall adhere. In addition, the report shall consist of issues identified, recommended resolutions, corrective action taken by the team, and issues that remain open. Each issue shall be related to one of more subclauses within the part to be qualified, identifying the specific violation.

Quality Committee will conduct audits of part quality at selected points in the part development cycle. The audits will ultimately be queries on quality processes used and results obtained. Ideally, the audits will not include inspection of the part documentation. The nature and frequency of the audits will vary over the course of the transition.

The Quality Committee will maintain final sign-off authority, based on audit results.

3.1 Advantages

Some of the advantages that will be gained from the transition include:

— faster turn-around for Quality Committee sign-off;

— project resources are retained for work in project development and internal review; and

— eliminated need for review workshops.

3.2 Disadvantages

The plan has some disadvantages over the current quality environment. The current environment required members of one project to review the work of another project. During and following the transition, efforts should be made to compensate for the loss of:

— cross-pollination of ideas between ISO TC 184/SC4 projects; and

— opportunity to learn from other project's mistakes.

4 Transition Plan

4.1 Task 1: Design quality system

Description: Applying principles of ISO 9000, design a quality system for SC4 that identifies specifications, communication and quality assessment mechanisms.

— Investigate applicability of ISO 9000, particularly the guidance in ISO 9004 [ISO9004-1] for developing a quality handbook.

— Develop an *SC4 quality handbook* that calls out the specifications, feedback communication, review procedures and assessment mechanisms that support built-in quality for all SC4 standards products. The handbook is intended to be used as a guide for development of standards products and will contain references to necessary materials for project teams.

Deliverables:

— *SC4 quality handbook* approved by SC4 resolution (1Q99)

4.2 Task 2: Expand scope of quality documentation

Description: The SC4 quality system as defined in task 1 will identify specifications, review procedures, quality assessment mechanisms applicable to each type of standard product currently produced by SC4. This task will extend the existing methods, procedures and checklists to cover all requirements of the designed quality system.

— Identify voids in quality documentation.

— Identify mechanism for providing resources to complete voids. This may include defining a percentage of the current resource requirement to be used for completing, and later, improving, quality documentation necessary for similar standards products.

— Create schedule for improving existing and developing new methods documents.

— Employ available resources to expand scope of existing documentation, or create new documents as required to support all standards in SC4.

Deliverables:

— Revised project leader check list (3Q98)

— Revised convener check list (3Q98)

— Revised and extended review procedures (3Q98)

— New and revised methods documents (as required)

— Revised supplementary directives that cover all SC4 parts (2Q98)

4.3 Task 3: Develop training program

Description: Develop an SC4 training program that will enable SC4 project teams to produce quality standards products. Include references to relevant documentation, commercially available training, freely available training, etc. Prioritize needs and implement the training program as allowed by available resources and established priorities.

— Draft training plan and gain consensus on its content.

— Prioritize training needs.

— Assign responsibility for completing training materials for training requirements according to prioritization.

— Provide training or promote available training opportunities.

— Develop a policy relating training to review team membership for internal project reviews.

Deliverables:

— *SC4 training program* published as SC4 N-numbered document (4Q98)

— Training material (ongoing)

— Training courses offered at ISO meetings (ongoing)

— Policy statement regarding training and review team membership, approved by SC4 (1Q98)

4.4 Task 4: Implement quality system

Description: Implement the SC4 quality system through a phased approach that maintains quality of SC4 standards products while transitioning responsibility for quality to project teams and working groups.

— Define phases characterized by different levels of review that allow the gradual implementation of the quality system.

— Define criteria that indicate when it is time to transition to the next level of review.

Deliverables:

— Review procedure policies for each phase, referenced by the *SC4 quality handbook* (4Q98)

— Policy for testing and implementing each phase (4Q98)

Annex A

References

[ISO8042] ISO 8042:1996, *Quality vocabulary*

[ISO9000-1] ISO 9000-1:1994, *Quality management and quality assurance standards ¾ Part 1: Guidelines for selection and use*

[ISO9004-1] ISO 9004-1:1994, *Quality management and quality system elements ¾ Part 1: Guidelines*

[SC4N369] ISO TC 184/SC4 N369, *STEP Application Protocol Qualification Manual*, 1995-12-10

[SC4N370] ISO TC 184/SC4 N370, *STEP Part Qualification Procedures*, 1995-12-10

[SC4N537] ISO TC 184/SC4 N537, *Supplementary Directives for the Drafting and Presentation of ISO 10303*, 1997-03-30

[SC4N679] ISO TC 184/SC4 N679, *SC4 Organization Handbook*, 1998-01-26

[QCN007] ISO TC 184/SC4 QC N007, *SC4 Part Review Procedure*, 1996-08-15

[QCN025] ISO TC 184/SC4 QC N025, *Conveners Approval Check List for ISO 10303*, 1997-02-25

[QCN026] ISO TC 184/SC4 QC N026, *Project Leader Approval Check List for ISO 10303*, 1997-02-26